

Outcome of 5,000 Flexible Sigmoidoscopies done by Nurse Endoscopists for Colorectal Screening in Asymptomatic Patients

Ankur Jain, John Falzarano MD, Amod Jain MD, Robert Decker MD, Gail Okubo RN, and Daryl Fujiwara MD

Abstract

Objectives: *There have been several studies to date establishing the efficacy of nurse endoscopists in colorectal screening. However, no such study has ever been conducted in Hawaii. Utilizing the large sample size of our study, we hope to further support endoscopy by nurses as both a safe and cost-effective means of screening for colon cancer.*

Methods: *This is a retrospective study of the results of more than 5,000 flexible sigmoidoscopies done by nurse endoscopists in the colorectal screening clinic at Kaiser Hospital in Honolulu, Hawaii, between November 1995 and February 2001. These results were separated into normal, non-neoplastic polyps, adenomas, and cancer.*

Results: *The rate of detection of polyps was 13.3% (non-neoplastic and adenomas). Colon cancer was detected in 15 patients (.3% detection rate), of which 8 were carcinoma in situ, 3 were Dukes A, 2 were Dukes B1/B2, and 2 were Dukes C2. Clinically significant lesions (ie. carcinoma, large adenomas, or atypical adenomas) were found in 1.8% of all patients. There were 8 carcinoids, 1 lipoma, 2 condylomas, and 3 leiomyomas detected. For patients who underwent colonoscopy, no other significant lesions were found in the areas examined by nurse endoscopists. There were no complications, i.e. perforation, bleeding, infection, and death, in any of the patients.*

Conclusion: *The results of our study emphasize the importance of being screened for colorectal cancer. Nurse endoscopists can safely and effectively perform screening flexible sigmoidoscopies. By training more nurse endoscopists, we can increase the rate of colorectal screening in a cost-effective manner.*

Purpose

Over 150,000 cases of colorectal cancer are diagnosed in the United States yearly. Over 90% of these patients are over the age of 50. As the United States population ages, over 50 million Americans will be eligible for colorectal cancer screening. Although screening flexible sigmoidoscopy is associated with a significant decrease in colorectal cancer mortality, only 30% of eligible patients have undergone sigmoidoscopy.¹ The projected increase in a population eligible for screening is expected to increase demand for this procedure and may overwhelm currently available endoscopic resources. Screening flexible sigmoidoscopy by nurse practitioners is the most cost-effective method available currently to reduce colorectal CA mortality.²⁻⁴ The purpose of this study is to evaluate the outcome of 5,000+ flexible sigmoidoscopies done at the Kaiser GI clinic between November 1995 and February 2001.

Subjects and methods

Patients were referred to the colorectal screening clinic if they met the following criteria:

- between 50 and 75 years of age (or above the age of 75 without any major medical conditions)
- free of GI symptoms
- no first degree relatives diagnosed with colorectal cancer below the age of 60
- not at high risk for developing colorectal CA:
 - ▲ no family history of familial adenomatous polyposis, juvenile polyposis, or other hereditary polyposis conditions
 - ▲ no family history of hereditary non-polyposis colorectal cancer
 - ▲ no personal history of adenomatous polyps
 - ▲ no personal history of colorectal cancer
 - ▲ no inflammatory bowel disease
- tested negative for fecal occult blood

Registered GI nurses who worked in the GI department for at least 2 years assisting gastroenterologists with colonoscopies were eligible for training in screening flexible sigmoidoscopy. They performed a minimum of 50 supervised flexible sigmoidoscopies prior to functioning independently. They were trained to perform biopsies of polyps less than 5mm in size, and consulted gastroenterologists for patients with polyps of larger size and/or multiple polyps.

Correspondence to:
Amod Jain MD
3288 Moanalua Rd.
Honolulu, HI 96819
Phone: (808) 432-8077
Fax: (808) 432-8201
E-mail: amodjain@pol.net

Initially, patients were recommended to have colonoscopy done for all adenomas. Later however, colonoscopy was limited to those adenomas greater than 9mm in size, smaller polyps with abnormal histology, e.g. atypia, and multiple small polyps found on sigmoidoscopy. The decision whether or not to proceed with colonoscopy for adenomas between 6 and 9mm size was left to the discretion of the gastroenterologists. This decision was based on the publication "Clinical practice guidelines for colorectal cancer screening".⁵ A similar screening strategy has been found to be the most efficient in terms of colonoscopies generated and cases of colorectal cancer detected.⁶

Results

The rate of detection of polyps was 13.3% (666/5017), out of which 290 (5.8%) were non-neoplastic and 376 (7.5%) were adenomas (Table 1). This is similar to published rates of detection by physicians performing flexible sigmoidoscopy.⁷⁻⁸ Table 2 breaks down adenomas by size.

Colon cancer was detected in 15 patients (.3% detection rate), out of which 8 were carcinoma in situ, 3 were Dukes A, 2 were Dukes B1/B2, and 3 were Dukes C2. See Tables 1 and 3. Upon reviewing the literature, there has been no consistent rate of colon cancer detection by physicians.⁷⁻⁸

Lesions were found to be clinically significant, i.e. carcinoma, adenomas with atypia, or large adenomas, in 1.8% (91/5017) of all patients.

There were 8 carcinoids, 1 lipoma, 2 condylomas, and 3 leiomyomas detected (Table 1).

For patients who underwent colonoscopy, no other significant lesions were found in the areas examined by nurse endoscopists.

There were no complications, i.e. perforation, bleeding, infection, and death, in any of the patients encountered. Upon reviewing the literature, flexible sigmoidoscopy by physicians carries a .004% risk of perforation.⁹ Colonoscopy is associated with a much higher rate of perforation, .19%, and a .019% risk of death.⁹

Discussion

Nurse endoscopists in our clinic safely and effectively performed over 5,000 screening flexible sigmoidoscopies. They detected clinically significant lesions (carcinoma, adenomas with atypia, or large adenomas) in approximately 1 out of every 56 asymptomatic patients. In addition, there were no complications from any of these procedures.

Several studies have explored the role of nurses in screening sigmoidoscopy. Schoenfeld et. al.² randomized patients to undergo screening flexible sigmoidoscopy by a nurse endoscopist or by a gastroenterologist. No differences in detection of adenomatous polyps or frequency of complications were found.

In the largest of these studies, Wallace et. al.¹ report the results of sigmoidoscopic screening by nurse practitioner (NP) and physician assistant (PA) endoscopists and gastroenterologists at a large institution. Polyps were detected in 23% of the examinations by physicians and in 27% of the examinations by NPs and PAs. After screening over 9,500 patients, the authors noted a 10% incidence of adenomatous polyps and a .32% incidence of colorectal cancer.¹⁰ These findings are similar to those of other large organizations that offer colon cancer screening using flexible sigmoidoscopy.

Because our study of colorectal screening by nurse endoscopists

was retrospective in nature, we could not directly compare our results with those of physician endoscopists. However, after undergoing sigmoidoscopic screening by nurses, no significant lesions were found in the rectosigmoid area on follow-up colonoscopy.

Colonoscopy is the most sensitive method of screening for colorectal lesions.¹¹ However, it is not feasible at this time to perform colonoscopy as a tool for mass screening because of the limited availability of gastroenterologists, the high cost of colonoscopy, and the complications associated with this procedure.

Several studies have shown the utility of fecal occult blood screening in reducing the incidence of colorectal cancer.¹² Flexible sigmoidoscopy of guiac negative patients by nurse endoscopists has been shown to be the most cost-effective method of screening the general population for colorectal cancer.¹³ In our opinion, this should become the primary large-scale screening tool for colorectal carcinoma in patients of average risk.

Conclusion

Nurse endoscopists can safely and effectively perform screening flexible sigmoidoscopy. Given the large number of significant lesions detected by nurse endoscopists in our study, their role in performing flexible sigmoidoscopy should be expanded in order to keep up with the increasing demand for colorectal cancer screening in the U.S.

Acknowledgement

We are grateful to the staff of the Kaiser GI department for helping us with this study.

Authors

John Falzarano MD, gastroenterologist, Kaiser Hospital
Amod Jain MD, gastroenterologist, Kaiser Hospital
Robert Decker MD, gastroenterologist, Kaiser Hospital
Daryl Fujiwara MD, gastroenterologist, Kaiser Hospital
Gail Okubo RN, Supervisor of GI Department, Kaiser Hospital
Ankur Jain, visiting 4th year medical student, Northwestern University

References

1. Wallace M, Kemp JA, Meyer F, et al. Screening for colorectal cancer with flexible sigmoidoscopy by nonphysician endoscopists. *American Journal of Medicine*. 1999 Sep; 107(3): 214-8.
2. Schoenfeld P, Lipscomb S, Crook J, et al. Accuracy of polyp detection by gastroenterologists and nurse endoscopists during flexible sigmoidoscopy: a randomized trial. *Gastroenterology*. 1999 Aug; 117(2): 486-9.
3. Maule WF. Screening for colorectal cancer by nurse endoscopists. *New England Journal of Medicine*. 1994 Jan 20; 330(3): 183-7.
4. Schoenfeld P, Cash B, Kita J, et al. Effectiveness and patient satisfaction with screening flexible sigmoidoscopy performed by registered nurses. *Gastrointestinal Endoscopy*. 1999 Feb; 49(2): 158-169.
5. Clinical practice guidelines for colorectal cancer screening. *Clinical Practice Guidelines, Kaiser Permanente Northern California Region*. September 1995.
6. Olynick JK, Platell CF, Collett JA. Fecal occult blood and flexible sigmoidoscopy screening for colorectal cancer: Modeling the impact on colonoscopy requirements and cancer detection rates. *Journal of Gastroenterology and Hepatology*. 2001 April; 16(4): 389-392.
7. Gupta TP, Jaszcwiski R, Luk GD. Efficacy of screening flexible sigmoidoscopy for colorectal neoplasia in asymptomatic subjects. *American Journal of Medicine*. 1989 May; 86 (5): 547-50.
8. McCallum RW, Meyer CT, Marignani P, et al. Flexible sigmoidoscopy: diagnostic yield in 1015 patients. *American Journal of Gastroenterology*. 1984 June; 79(6): 433-7.
9. Anderson ML, Pasha TM, Leighton JA. Endoscopic perforation of the colon: lessons from a 10-year study. *American Journal of Gastroenterology*. 2000 Dec; 95: 3418-3422.
10. Horton K, Reffel A, Rosen K, Farraye FA. Training of nurse practitioners and physician assistants to perform screening flexible sigmoidoscopy. *J Am Acad Nurse Pract*. 2001 Oct; 13(10): 455-9.
11. Lieberman DA, Harford WV, Ahnen DJ, et al. One-time screening for colorectal cancer with combined fecal occult-blood testing and examination of the distal colon. *New England Journal of Medicine*. 2001 Aug 23; 345(8): 555-560.
12. Mandel JS, Church TR, Bond JH, et al. The effect of fecal occult blood screening on the incidence of colorectal cancer. *New England Journal of Medicine*. 2000 Nov 30; 343: 1603-7.
13. Frazier AL, Colditz GA, Fuchs CS, and Kuntz KM. Cost-effectiveness of screening for colorectal cancer in the general population. *Journal of the American Medical Association*. 2000; 284: 1954-61.

| Table 1.– Total flexible sigmoidoscopies performed | | | | | | | |
|--|---------------|------|------|------|------|--------------|-------|
| Results | Nov 1995-1996 | 1997 | 1998 | 1999 | 2000 | Jan-Feb 2001 | Total |
| Total | 928 | 991 | 1018 | 1034 | 936 | 110 | 5017 |
| Normal or no significant pathology | 789 | 870 | 894 | 885 | 797 | 87 | 4322 |
| Non-neoplastic polyps | 62 | 46 | 47 | 67 | 58 | 10 | 290 |
| Adenomas | 73 | 71 | 69 | 75 | 75 | 13 | 376 |
| Adenocarcinoma | 1 | 3 | 6 | 3 | 2 | 0 | 15 |
| Carcinoid | 1 | 1 | 1 | 2 | 3 | 0 | 8 |
| Lipoma | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Condyloma accuminata | 0 | 0 | 1 | 1 | 0 | 0 | 2 |
| Leiomyoma | 2 | 0 | 0 | 0 | 1 | 0 | 3 |

| Table 2.– Breakdown of adenoma | | | | | | | |
|-------------------------------------|---------------|------|------|------|------|--------------|-------|
| Results | Nov 1995-1996 | 1997 | 1998 | 1999 | 2000 | Jan-Feb 2001 | Total |
| Total | 73 | 71 | 69 | 75 | 75 | 13 | 376 |
| Adenoma <6mm | 49 | 52 | 37 | 38 | 44 | 8 | 228 |
| Adenoma 6-9mm | 8 | 11 | 10 | 21 | 20 | 2 | 72 |
| Adenoma >9mm or adenoma with atypia | 16 | 8 | 22 | 16 | 11 | 3 | 76 |

| Table 3.– Breakdown of adenocarcinoma | | | | | | | |
|---------------------------------------|---------------|------|------|------|------|--------------|-------|
| Results | Nov 1995-1996 | 1997 | 1998 | 1999 | 2000 | Jan-Feb 2001 | Total |
| Total | 1 | 3 | 6 | 3 | 2 | 0 | 15 |
| Ca in situ | 0 | 1 | 4 | 2 | 1 | 0 | 8 |
| Dukes A | 1 | 0 | 1 | 1 | 0 | 0 | 3 |
| Dukes B1/B2 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| Dukes C2 | 0 | 0 | 1 | 0 | 1 | 0 | 2 |